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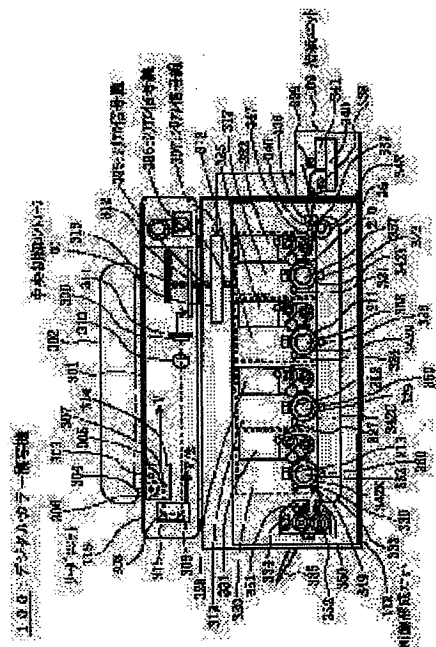
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## (54) IMAGING APPARATUS

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide an imaging apparatus in which a unit developed as a new type of a color copy machine can be used as it is without requiring any extra interface signal when it is used in a copy machine of other type.

**SOLUTION:** A programmable unit having a sheet feed function, an imaging function and a sheet sorting function is provided and an operating program corresponding to at least one of the sheet feed function, imaging function and sheet sorting function is stored. Means for storing the operating program is provided at a main control section and when operation of the main control section is started, identification information of the unit is read out and the operating program of a unit corresponding to the identification information thus read out is transmitted to the unit corresponding to the identification information thus read out.



## LEGAL STATUS

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CLAIMS

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[Claim(s)]

[Claim 1] At least one function is provided among the feed function of a form, an image formation function, and the classification function of a form. Among the feed function of the form in the main control section and the; above-mentioned unit which control a programmable unit and the; above-mentioned unit, and make the core of image formation equipment, an image formation function, and the classification function of a form. At the time of initiation of the program preservation means of operation which saves the program of operation corresponding to at least one function, and is formed in the above-mentioned main control section, and the; above-mentioned main control section of operation. The program of the unit corresponding to the identification information read by the identification information reading means and the; above-mentioned identification information reading means of reading the identification information of the above-mentioned unit of operation. Image formation equipment characterized by having an of operation program transmitting means to transmit to the unit corresponding to the identification information read by the above-mentioned identification information reading means, and;

[Claim 2] It is image formation equipment characterized by driving the motor by which the above-mentioned unit performs at least one feedback control in claim 1.

[Claim 3] It is image formation equipment characterized by the above-mentioned unit having a microcomputer, a high-speed digital signal processor, or FPGA in claim 1.

[Claim 4] Image formation equipment characterized by having an error signal output means to output an error signal when the program of the unit corresponding to the identification information read by the above-mentioned identification information reading means of operation is not saved for the above-mentioned program preservation means of operation in claim 1.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is used for a color copying machine, concerning image formation equipment.

[0002]

[Description of the Prior Art] As one of the conventional image formation approaches, such as a color copying machine, the method using the photoconductor drum which are four \*\*\*\*\* is learned.

[0003] In the above-mentioned conventional example, in order to form a color picture in a form, a color picture is formed by composition of each color using the toner of four colors of the toner of three colors of MAZENDA which is the complementary color of a color, cyanogen, and yellow, and the black toner for raising repeatability, such as an alphabetic character.

[0004] And while a photo conductor is arranged and this photo conductor arranged rotates every four colors, the above-mentioned toner image is imprinted for every color in the record form which scanned light, formed the electrostatic image corresponding to each color, developed negatives with the toner of each color, and was conveyed by the laser beam etc. by the imprint belt, and a color picture is obtained by this in it.

[0005] A color copying machine can be divided into the feed unit which can divide this color copying machine into two or more functional units, that is, conveys a form to the image formation section, the image formation unit which forms an image on the conveyed form, and the double-sided unit for carrying out image formation to both sides of a form.

[0006] In the unit of these plurality, for example, a feed unit is not used only for one model of color copying machine, but it can be used for the material of the form to which paper is fed, and a printer with same feed rate and productivity, and if the feed rate etc. is the same, it can be used also for monochrome copying machine.

[0007]

[Problem(s) to be Solved by the Invention] By the way, in the above-mentioned conventional example, when developing a feed unit by using the image formation unit of a copying machine as the main unit, it is necessary to develop the interface which delivers the signal of a drive/halt of a motor, the signal of those with paper / nothing sensor of the feed sensor which exists in a form conveyance on the street, etc. between the above-mentioned image formation unit and the above-mentioned feed unit. In this case, the above-mentioned interface communicates by the 1-bit signal as the signal of a drive/halt of a motor, and a signal of those with paper / nothing sensor of a feed sensor.

[0008] Therefore, when enabling it to use the feed unit developed as a predetermined model of color copying machine with the copying machine of other models, even if a feed motor rate is different for a while, it will be necessary to change the filter constant of a motorised circuit.

[0009] For this reason, when enabling it to use the feed unit developed as a predetermined model of color copying machine with the copying machine of other models, it cannot be used with no correcting a feed unit, but the number of models of a feed unit will increase, a new interface signal will be added, and there is a problem that the cost of a feed unit goes up.

[0010] In order to solve this problem, CPU or FPGA is used into a drive unit, an interface with the main unit is made into means of communications, such as serial communication, and it is possible to fix a motor and the protocol of delivery of sensor information. However, even if such, it connects with the above-mentioned

image formation unit, and in the feed unit to be used, it may be accompanied by modification of a communications protocol, and constant modification of the Motor Driver circuit, and the problem that the cost of a feed unit goes up cannot be solved in this case.

[0011] The above-mentioned problem is a problem produced also about units other than a feed unit.

[0012] This invention aims at offering the image formation equipment which can use the above-mentioned unit with no correcting, without adding a new interface signal, when enabling it to use the unit developed as a predetermined model of color copying machine with the copying machine of other models.

[0013]

[Means for Solving the Problem] This invention possesses the feed function of a form, an image formation function, the classification function of a form, etc., and prepares a programmable unit. The program of operation corresponding to at least one function is saved among the feed function of the form in the above-mentioned unit, an image formation function, and the classification function of a form. The program preservation means of operation formed in the above-mentioned main control section is established. At the time of initiation of the main control section of operation The identification information of the above-mentioned unit is read and it is image formation equipment which transmits the program of the unit corresponding to the read identification information of operation to the unit corresponding to the read identification information the account of a top.

[0014] By this, since the versatility of a unit increases, it can be used for many equipments and cost reduction of the unit itself can be carried out. Moreover, the versatility of a unit improves further by digitizing and programming the motor control part in a unit.

[0015]

[The gestalt and example] of implementation of invention Drawing 1 is the cross-section schematic diagram showing the digital color copying machine 100 which is one example of this invention.

[0016] The reader section is prepared in the upper part of the digital color copying machine 100, and the printer section is prepared in the lower part of the digital color copying machine 100.

[0017] The [configuration of reader unit 115] digital color copying machine 100 has the substrate 311 with which CCD300 and CCD300 are mounted, and the image-processing section 312.

[0018] Moreover, the digital color copying machine 100 has manuscript base glass 301 and manuscript feeding equipment (DF) 302. In addition, you may make it equip with the mirror plane pressure plate which is not illustrated instead of this manuscript feeding equipment 302.

[0019] Furthermore, the digital color copying machine 100 has the light sources (a halogen lamp or fluorescent lamp) 303 and 304 which illuminate a manuscript, the reflectors 305 and 306 which condense the light from the light sources 303 and 304 in a manuscript, mirrors 307-309, the lens 310 which condenses the reflected light or projection light from a manuscript on CCD300, and carriage 314.

[0020] Carriage 314 holds halogen lamps 303 and 304, reflectors 305 and 306, and a mirror 307. The rate of carriage 314 is V, and the rate of carriage 315 is V/2, and scans the whole surface of a manuscript by moving perpendicularly mechanically to the electric scan (horizontal scanning) direction of CCD300 (vertical scanning). The read image is sent to the CC controller 101 through the image-processing section.

[0021] And the digital color copying machine 100 has the carriage 315 which holds mirrors 308 and 309, and the interface (I/F) section 313 with other IPU etc.

[0022] It connects with the CC controller 101 by the serial communication line 395, and the above-mentioned reader unit 115 reads an image according to a communication link command with the CC controller 101.

[0023] [The configuration of the feed unit 109], next the feed unit 109 which feeds paper to the form stored are explained.

[0024] Paper is fed to the recording paper stored in cassettes 340 and 341 for every sheet with pickup rollers 339 and 338. Through the serial communication line 397, it connects with the CC controller 101 and this feed unit 109 performs feed actuation according to the communication link command between the CC controllers 101.

[0025] [The configuration of the image formation unit 112], next the image formation unit 112 are explained.

[0026] In Y image formation section 317, M image formation section 318, C image formation section 319, and K image formation section, since the configuration of 320 is mutually the same, Y image formation section 317 is explained to a detail, and explanation of other image formation sections is omitted.

[0027] In Y image formation section 317, a photoconductor drum 342 is driven with a stepping motor 357. A

latent image is formed in the front face of the light from LED array 210.

[0028] The primary electrification machine 321 electrifies the front face of a photoconductor drum 342 in predetermined potential, and prepares latent-image formation. A development counter 322 develops the latent image on a photoconductor drum 342, and forms a toner image. The sleeve 352 for impressing and developing development bias is contained in the development counter 322. The imprint electrification machine 323 performs discharge from the tooth back of the imprint belt 333, and imprints the toner image on a photoconductor drum 342 to the recording paper on the imprint belt 333. In the above-mentioned example, since imprint effectiveness is good, the cleaner section is not arranged. In addition, you may make it equip with the cleaner section.

[0029] The recording paper is supplied on the imprint belt 333 with the feed rollers 336 and 337. The supplied recording paper is charged with the adsorption zone electrical machinery 346. The imprint belt roller 348 is driven with a stepping motor 361. This imprint belt roller 348 drives the imprint belt 333, moreover, it becomes the adsorption zone electrical machinery 346 and a pair, electrifies the detail paper, and makes the imprint belt 333 adsorb the detail paper. The paper tip sensor 347 detects the tip of the recording paper on the imprint belt 333. In addition, the detecting signal of a paper tip sensor is used as a vertical-scanning synchronizing signal at the time of being sent to the color reader section from the printer section, and sending a video signal to the printer section from the color reader section.

[0030] The detail paper is conveyed with the imprint belt 333, and a toner image is formed in that front face in order of YMCK in the image formation sections 317-320 next. In order to dissociate from the imprint belt 333 easily, after the detail paper which passed K image formation section 320 is discharged with the electric discharge electrification vessel 349, it is separated from the imprint belt 333.

[0031] The exfoliation electrification machine 350 prevents the image turbulence by exfoliation discharge, in case the detail paper dissociates from the imprint belt 333. The separated recording paper is delivered to a paper output tray 335, after being charged with the electrification vessels 351 and 352 before fixing and heat fixing of the toner image is carried out by the fixing assembly 334, in order to compensate the adsorption power of a toner and to prevent image turbulence.

[0032] Through the serial communication line 396, it connects with the CC controller 101 and this image formation unit 112 forms an image between the CC controllers 101 according to a communication link command.

[0033] Drawing 2 is the block diagram showing the relation between the CC controller 101 in the digital color copying machine 100, and the feed unit 109, the image formation unit 112 and the reader unit 115.

[0034] In the CC controller 101 in the digital color copying machine 100, the CC controller 101 of image formation equipment is controlled by CPU104, and ROM105 and RAM106, and the control program required for actuation of image formation equipment is built in in ROM105. The serial controller 102 and I/O Port 103 are connected with CPU104 through the address bus 107 and the data bus 108.

[0035] MPU110 by which the feed unit 109 controls the feed unit 109 inside is contained. This MPU110 is ROM, RAM, and CPU that builds in a circumference circuit. Moreover, the address information which shows actuation and the built-in function of this feed unit 109 is stored in the address information storing section 111.

[0036] MPU113 by which the image formation unit 112 controls the image formation unit 112 to the interior is formed. This MPU is ROM, RAM, and CPU that builds in a circumference circuit. Moreover, the address information which shows actuation and the built-in function of this image formation unit 112 is stored in the address information storing section 114.

[0037] MPU116 by which the reader unit 115 controls the reader unit 115 to the interior is stored. This MPU is ROM, RAM, and CPU that built in the circumference circuit. Moreover, the address information which shows actuation and the built-in function of this reader unit 115 is stored in the address information storing section 117.

[0038] Drawing 3 is a flow chart which shows actuation of CPU prepared in the CC controller 101 in the above-mentioned example.

[0039] If the power source of the digital color copying machine 100 is turned on, the CC controller 101 will start actuation and initialization of CPU will be performed (S2). After that, initialization of a unit retrieval number is performed and the initial unit number 0 is chosen (S3). First, the address information of the selected unit is read and it is judged whether data are except zero (S5). When this address information is 0, it is the case where the unit is not connected to the CC controller 101.

[0040] If other units are connected to the CC controller 101, address information is except zero. And if address information is except zero, the program for units according to the address information of a connection unit will be chosen (S7). The selected unit is told about generating and booting serial interruption to MPU of the selected unit, and a boot code is transmitted to it after that (S8).

[0041] And the selection program saved in ROM connected to CPU is booted in the memory in Selection MPU. After that, the retrieval number of a unit number is incremented (S10), and a boot activity is continued.

[0042] Drawing 4 is a flow chart which shows actuation of MPU in the subunit connected to the CC controller 101 in the above-mentioned example.

[0043] If the power source of the digital color copying machine 100 is turned on, MPU of a subunit (the feed unit 109, the image formation unit 112, reader unit 115 grade) will start actuation, and the status register in MPU will be initialized (S22). And the serial port for communicating with CPU of the CC controller 101 is initialized (S23).

[0044] It tells that MPU set the serial ready signal to "LOW" as a notice means to CPU since the program boot by serial communication was attained, and the program boot by serial communication was attained by the above actuation (S24).

[0045] After that, it becomes the standby mode which stands by serial interruption from CPU of the CC controller 101 (S25). If serial interruption is received from CPU104 of the CC controller 101, the boot code from CPU104 will be received (S26). And a program [ required for unit actuation of CPU104 to MPU ] of operation is loaded (S27). It is judged after that whether the transfer of a program was completed (S28), if it is transfer termination, it branches to the entry point of a MPU actuation program, and a program is mounted.

[0046] Drawing 5 is the block diagram showing the relation between the image formation unit 112 and the feed units 109a, 109b, and 109c in the digital color copying machine 100.

[0047] The image formation unit 112 is a printer and forms an image in the form conveyed from the feed units 109a, 109b, and 109c. To this image formation unit 112, the program of the feed units 109a, 109b, and 109c which may be connected to the image formation unit 112 is saved.

[0048] Feed unit 109a is a unit which performs medium-speed feeding, feed unit 109b is the medium-speed feeding unit 109 which can feed paper also to a comparatively thick form, and feed unit 109c is a unit which performs high-speed feeding.

[0049] Although the working speed of a printer and the feed unit 109 which doubled timing needed to be conventionally prepared since the working speed of the image formation unit 112 was decided In the above-mentioned example, the unit to which the form feeding rate and timing of the feed unit 109 exceed a printer Since the program of operation for feed unit 109 corresponding to the working speed of the image formation unit 112 is built in the image formation unit 112 (body of a printer), it can connect with the image formation unit 112, without changing the feed unit 109.

[0050] Therefore, since the class of printer which can connect the feed unit 109 increases sharply and mass-production nature improves, the cost of the unit itself can be reduced.

[0051] Moreover, even if the operating sequence of the connected feed unit 109 becomes a defect, if only it rewrites the program for units stored in the feed unit 109, without exchanging the feed unit 109 connected, the defect of the operating sequence of the connected feed unit 109 can be canceled, without changing the hardware in the feed unit 109.

[0052] In addition, in the above-mentioned example, the above-mentioned unit is a unit which drives the motor which performs at least one feedback control.

[0053] In addition, you may make it apply the above-mentioned example to image formation equipments other than a digital color copying machine.

[0054]

[Effect of the Invention] When using the unit developed as a predetermined model of color copying machine with the copying machine of other models according to this invention, the effectiveness that the above-mentioned unit can be used with no correcting is done so, without adding a new interface signal.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the cross-section schematic diagram showing the digital color copying machine 100 which is one example of this invention.

[Drawing 2] It is the block diagram showing the relation between the CC controller 101 in the digital color copying machine 100, and the feed unit 109, the image formation unit 112 and the reader unit 115.

[Drawing 3] In the above-mentioned example, it is the flow chart which shows actuation of CPU prepared in the CC controller 101.

[Drawing 4] In the above-mentioned example, it is the flow chart which shows actuation of MPU in the subunit connected to the CC controller 101.

[Drawing 5] In the digital color copying machine 100, it is the block diagram showing the relation between the image formation unit 112 and the feed units 109a, 109b, and 109c.

[Description of Notations]

100 — Digital color copying machine,

101 — CC controller,

109 — Feed unit,

112 — Image formation unit,

115 — Reader unit.

[Translation done.]



## \* NOTICES \*

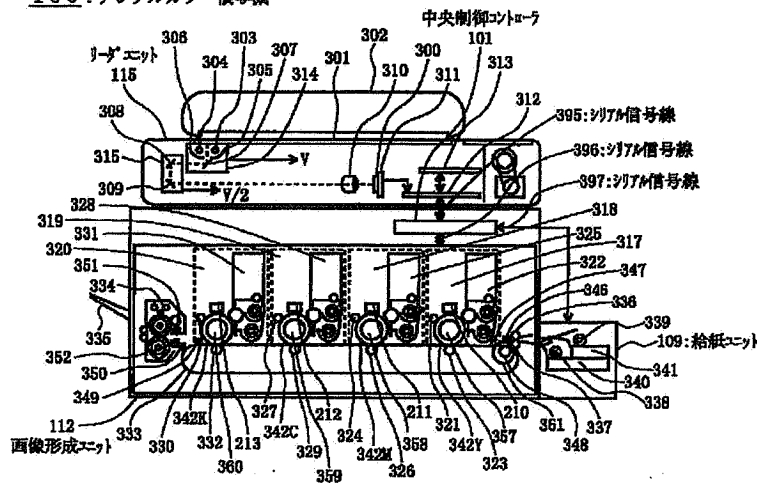
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## DRAWINGS

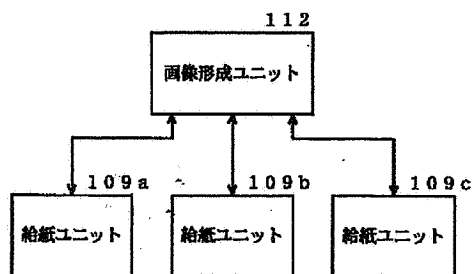
## [Drawing 1]

100: デジタルカラー複写機

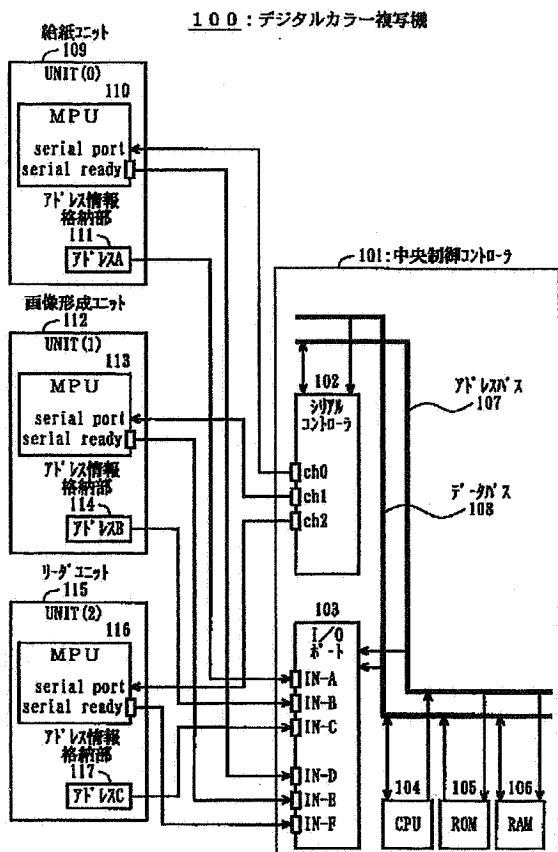


## [Drawing 5]

100: デジタルカラー複写機

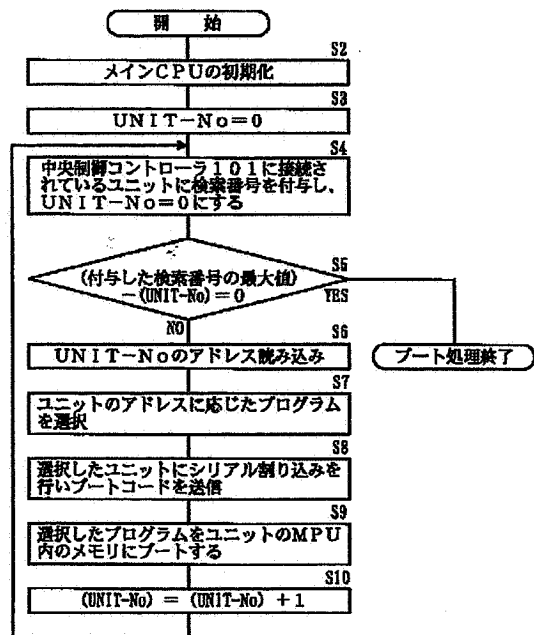


## [Drawing 2]



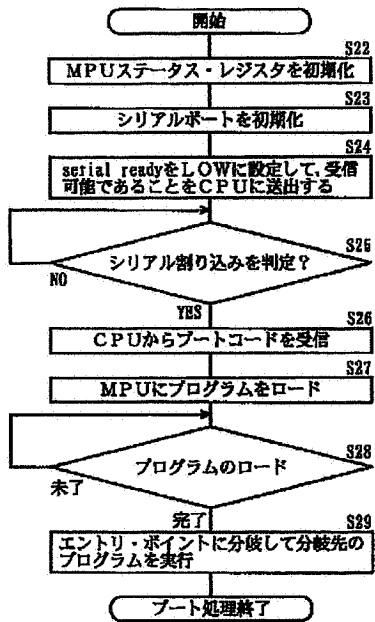
[Drawing 3]

中央制御コントローラ101の動作



[Drawing 4]

## ユニットの動作



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